

# Envisioning the Digital Economy

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## ABSTRACT

Visions of the future have played, and continue to play, a fundamental role in the ways in which technology is designed, developed, distributed and experienced. This paper argues for the need within the Digital Economy Research programme to employ a critical approach to these visions and their various uses. There is a need to recognise the crucial role that antecedent creative work (such as science fiction) plays in framing how new technologies are developed, received in and positioned by society. We also suggest the need to reassess the ways in which visions of technological futures are vulnerable to the fragility of forecasting, and argue instead for the value of fiction in developing present visions of technological futures. Foregrounding the assumptions implicit in visions of the future is an attempt to spread risk, and open up a greater diversity of choices of ‘future’. The value of the future for technology design work and policy making lies in the space it opens up for creative thought, a space that can only be realised through reflexive, critical processes.

## Categories and Subject Descriptors

K.4.0 [Computing Milieus]: Computers and Society—*general*.

## General Terms

Design.

## Keywords

Forecasting, foresight, envisioning, futurology, fiction.

## 1. INTRODUCTION

To the Lydians who were to carry these gifts to the temples Croesus gave charge that they should ask the Oracles this question also—whether Croesus should march against the Persians [...] the answers of both the Oracles agreed in one, declaring to Croesus that if he should march against the Persians he should destroy a great empire... (Herodotus 1890)

One of the problems that all human societies face is that actions in the present can have significant implications for the future, which, by its very nature, is uncertain. These actions can lead to catastrophe: Croesus failed to realize that the great empire to be destroyed would be his. As a result, there is great interest in finding ways to generate visions of the future that provide a stable basis for current decisions and avoid what prove to be mistakes.

Historically, much effort has been put into developing quantitative models that can be rolled forward into the future and constrain the possible pathways for action. These can be traced back to the

origins of the insurance industry in early modern Europe and the development of the mathematics of probability in the 17<sup>th</sup> century. Today, they are represented in the heavy investment in forecasting and the development of predictive tools that can extrapolate from the present into the future on predominantly rational and linear assumptions. However, this can be an approach that lacks resilience and fails to capture a number of fundamentals, such as: the diversity of human behaviour, the interaction between the data sources used within a forecast and the forecast itself (e.g., market feedbacks), the unpredictability of high-impact low-probability ‘black swan’ events [8], and the possibility of disruptive innovations. It is these issues which lead to a reconsideration of how forecasting might feature in our understanding of the future.

This paper argues for the value of a critical approach to the ways in which these visions of the future are created and subsequently used (rhetorically, practically, etc.). Within the context of the Digital Economy (DE) Research programme, we seek to develop critical techniques that can be used to test strategies for the future and expose their underlying assumptions. Firstly we consider the impact of historical visions of the future upon present technologies and their prospects. Secondly we explore contemporary design and policy visions of the future and their use in justifying investments in the present. We contend that—alongside rational-scientific approaches—equal weight should be given to the qualitative visions and tools (e.g., scenario design) developed by creative practitioners in works of fiction, art and film and to the analyses of their implications by a range of scholars from the social and cultural sciences.

## 2. THE FUTURE IN THE PAST

Creators of new technologies tend to think that their designs will be received as a genuine novelty, rolling out into a society that has never encountered anything like them before. Frequently, to the creators’ surprise, the response is that the technology has indeed been encountered before, in the imaginative worlds of that society as these have been conceived by creative artists. The world of the imagination is the source of the interpretive frames that ordinary members of the society invoke to make sense of the new technology. A framing already exists before the technology comes into the world and shapes its entry and its reception. The results of this framing may be either positive or negative.

Many of the scientists who developed genetically modified crops thought they were conferring a benefit on humankind comparable to the impact of the ‘Green Revolution’, which raised rice and wheat crop yields throughout Asia from the late 1960s. In practice, they were met as creators of ‘Frankenfoods’, evil manipulators of nature for private or corporate gain by a public that had read *Brave New World*, *Day of the Triffids* and similar fictions for several generations previously [7]. In the same way, computer science has often found itself in the shadow of George Orwell’s

*Big Brother* or the ambiguous paternalism of HAL from *2001: A Space Odyssey* or Proteus, the computer that impregnates Julie Christie in *Demon Seed*. The all-knowing state with a webcam in every home has already been envisioned, as has the world where computers displace humanity.

This argument has recently been pressed further to propose a notion of *social precognition* that suggests technological innovation is necessarily prefigured by creative representation: NASA can send rockets to the moon in part because the notion of sending rockets to the moon had been developed almost a century before by Jules Verne. Immortality is explored in fiction long before Ray Kurzweil proposed a technological pathway [4]. Fictional computers drive the development of real ones [5]. Thus, futures imagined in the past invade the present and constrain as well as inform the possibilities for action. In this way social precognition offers us a description of influencing *path dependent* factors of technological developments in society.

### 3. THE FUTURE IN THE PRESENT

Corresponding with this entanglement of novel technologies and antecedent fiction, is an entanglement of fiction and the futures forecast by technologists. For instance, Johnson's 'future casting' [6] uses fiction as a method for exploring a set of projected futures and outcomes that his employer—Intel—can pursue. These approaches implicitly recognise the value of imagined futures for the development of innovations in the present. However, they are often oriented by the same rational and linear assumptions as traditional forecasting techniques, and offer limited exploration of the social context within which these innovations are likely to be delivered and used.

Forecast futures serve to close down present options by presenting themselves as self-evident solutions rather than as solutions only to current formulations of the problems. For instance, discussions around the UK's High Speed 2 rail project [1] tend to neglect implicit assumptions that the only travel of value in the UK is to or from the South East. In doing so, it excludes the possibility that a fast—not necessarily high-speed—link between northern cities might be more beneficial for levelling regional inequalities by creating a rival pole of development within the UK. Nor does it consider the implications of a greater degree of independence for Scotland and its possible ramifications for travel demand.

We may connect this critique to the sociology of expectations, which emphasises the degree to which imagined futures are used to solve social problems or articulate values in the present rather than to serve as literal predictions of what is to come [3]. We also point towards the role of 'design fiction' techniques that use purely fictional notions of the future as a critical method for design reflection [2]. The real value of these imagined futures is not in predicting or forecasting, but rather to help investigate the problem to which an answer is being proposed in classic sociological terms: who says this is a problem, and by reference to what norms and values?

Opening up these questions in technology design futures also provides a valuable tool for public engagement in policy futures. Foresight modelling is notoriously difficult to engage with, in part because its reliance on metrics rather than narratives is so remote from the experience of ordinary citizens. By reverse engineering the metrics back to narratives, such as via diverse sets of scenarios, their normative assumptions can be revealed and citizens invited to debate the futures embedded within the model's starting points and projected by its outcomes.

Leading from this, we may conjecture that engaging in fictional rather than forecast futures offers a better understanding for questions such as: how far do citizens actually want to live in the society that the DE could achieve? What are the different visions that could be supported by the same technological developments? How would one be achieved rather than another?

### 4. CONCLUSION

DE research may have a great deal to gain from increased attention to creative works of fiction as an input to, rather than an output of, its efforts. Broadly, we argue here for the development of an interdisciplinary strand of work concerned with understanding the opportunities and risks associated with the ways in which notions of 'future' ('fictive', 'factive' or somewhere in between) are employed within DE research agendas. This research strand would extend to unpack how futures are deployed in design decisions, research funding, research outputs, policies and politics.

In taking this critical turn, this work may stimulate design innovation by its representations of possible technologies and their futures. It may facilitate the transfer of technologies into practical or commercial use by identifying any cultural barriers to adoption that are already established in the iconography of particular societies or social groups. It may offer a powerful resource for public engagement in examining and evaluating developments before there is social and economic lock-in. In particular, creative works open up choices and visions that should lead us towards thinking in terms of developing technology pathways, building in resilience through engagement with a range of possible futures, instead of searching for a single yellow brick road. As the insurance industry discovered 400 years ago, security comes from the spreading of risk rather than from its concentration in a single investment. Given the inherent uncertainty of the future, this seems a more appropriate strategy than the search for a single output.

### 5. ACKNOWLEDGMENTS

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### 6. REFERENCES

- [1] Aizlewood, K. & Wellings, R. (2011) *High Speed 2: the next government project disaster?* Institute of Economic Affairs, IEA Discussion Paper 36.
- [2] Bleecker, J. (2009) *Design Fiction: A short essay on design, science, fact and fiction.* <http://www.nearfuturelaboratory.com>
- [3] Brown, N., Rappert B. & Webster A., eds. (2000) *Contested Futures: A Sociology of Prospective Techno-Science.* Ashgate, Aldershot.
- [4] Dingwall, R. (2009) The need for death. *Society* 46, 3, 247-9.
- [5] Dourish, P. & Bell, G. (to appear) "Resistance is futile": Reading science fiction alongside ubiquitous computing. *Personal and Ubiquitous Computing.*
- [6] Johnson, B. D. (2011) *Science Fiction Prototyping: Designing the Future with Science Fiction.* Morgan & Claypool, San Rafael, CA
- [7] Nerlich, B., Clarke, D. D. & Dingwall, R. (2000) Cloning and crops: contextual modulation of metaphor and meaning in two debates about bioengineering. *Metaphor and Symbol* 15, 4, 223-40.
- [8] Taleb, N. N. (2007) *The Black Swan: The Impact of the Highly Improbable.* Random House.